

#5

OIPE

RAW SEQUENCE LISTING
 PATENT APPLICATION: US/09/824,735

DATE: 09/07/2001
 TIME: 14:11:35

Input Set : A:\205645US20.txt
 Output Set: N:\CRF3\09072001\I824735.raw

3 <110> APPLICANT: ZHU, JIAN-KANG
 4 LIU, JIPIING
 5 ISHITANI, MANABU
 6 HALFTER, URSULA
 7 KIM, CHEOL-SOO
 9 <120> TITLE OF INVENTION: PROTEINS AND DNA RELATED TO SALT TOLERANCE IN PLANTS
 11 <130> FILE REFERENCE: 205645US20
 13 <140> CURRENT APPLICATION NUMBER: 09/824,735
 C--> 14 <141> CURRENT FILING DATE: 2001-08-17
 16 <150> PRIOR APPLICATION NUMBER: US 60/824,735
 17 <151> PRIOR FILING DATE: 2000-04-04
 19 <160> NUMBER OF SEQ ID NOS: 16
 21 <170> SOFTWARE: PatentIn version 3.1
 23 <210> SEQ ID NO: 1
 24 <211> LENGTH: 5144
 25 <212> TYPE: DNA
 26 <213> ORGANISM: Arabidopsis thaliana
 28 <220> FEATURE:
 29 <221> NAME/KEY: CDS
 30 <222> LOCATION: (2004)..(2168)
 31 <223> OTHER INFORMATION:
 34 <220> FEATURE:
 35 <221> NAME/KEY: CDS
 36 <222> LOCATION: (2255)..(2317)
 37 <223> OTHER INFORMATION:
 40 <220> FEATURE:
 41 <221> NAME/KEY: CDS
 42 <222> LOCATION: (2416)..(2487)
 43 <223> OTHER INFORMATION:
 46 <220> FEATURE:
 47 <221> NAME/KEY: CDS
 48 <222> LOCATION: (2573)..(2680)
 49 <223> OTHER INFORMATION:
 52 <220> FEATURE:
 53 <221> NAME/KEY: CDS
 54 <222> LOCATION: (2778)..(2852)
 55 <223> OTHER INFORMATION:
 58 <220> FEATURE:
 59 <221> NAME/KEY: CDS
 60 <222> LOCATION: (2921)..(3100)
 61 <223> OTHER INFORMATION:
 64 <220> FEATURE:
 65 <221> NAME/KEY: CDS
 66 <222> LOCATION: (3225)..(3314)
 67 <223> OTHER INFORMATION:
 70 <220> FEATURE:
 71 <221> NAME/KEY: CDS

ENTERED

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/824,735

DATE: 09/07/2001
TIME: 14:11:35

Input Set : A:\205645US20.txt
Output Set: N:\CRF3\09072001\I824735.raw

72 <222> LOCATION: (3418)..(3540)
73 <223> OTHER INFORMATION:
76 <220> FEATURE:
77 <221> NAME/KEY: CDS
78 <222> LOCATION: (4052)..(4171)
79 <223> OTHER INFORMATION:
82 <220> FEATURE:
83 <221> NAME/KEY: CDS
84 <222> LOCATION: (4400)..(4516)
85 <223> OTHER INFORMATION:
88 <220> FEATURE:
89 <221> NAME/KEY: CDS
90 <222> LOCATION: (4735)..(4791)
91 <223> OTHER INFORMATION:
94 <220> FEATURE:
95 <221> NAME/KEY: CDS
96 <222> LOCATION: (4879)..(4953)
97 <223> OTHER INFORMATION:
100 <220> FEATURE:
101 <221> NAME/KEY: CDS
102 <222> LOCATION: (5038)..(5130)
103 <223> OTHER INFORMATION:
106 <400> SEQUENCE: 1
107 ttttggcgg gaaaatctcg gtttacgtt tttggcggga aatctcgta tttacgtttt 60
109 tggcggaaa atctcggtt tacgtttttt gcgagaaaat cacgggtta ctttttttg 120
111 cggaaaatc acggattttt gtttttttgt ggaaaaattt cgagttact ttttctcaat 180
113 ttcattgctt gtatatttaa gaaatttggaa aaaatattaa ttttattaa ttggtttaga 240
115 tgtgttgggtt aaaccttaat tggcatttgtt ttagagattt tagttggttt tattcaattt 300
117 tacaaaattt gatgggttaa ttggataaac catggaaacc attaaccatt acaacctaacc 360
119 tcattttact catcaaacca attgactcat caactcattt gactcatcaa ctcatttgag 420
121 tcaaaaattt caactcatta gggttcatgg gttgagttga gttgagttga cccatgaatt 480
123 ttgacccatt ttgacacccc tacatatgtat cataagttaa taatcaaaaa ttactattga 540
125 taactttta acggaattgt tttgttaagtt tcatttacgt tattttata aaaaaacata 600
127 atgcaaaagt actaatgtat agtttattttt atttttaata atgcaaaaat attactgtaa 660
129 tacttttca ttcttatcaa tattttttct tatattcaat tagccaccaa cacctacatt 720
131 tcataatttct cttcacatc attattttct tgctcttgta ttccttctta tcattttcat 780
133 tgccaaatttt tcattgacat tgtcatcggtt actttgtatg tatgattttt gaacatttaa 840
135 tgtgaatccc aaccgactat aggactatca agaagtttc aaactttta aaaaagatct 900
137 tgaaccttta aagcaaatcc caaccgacta tagaaccata gtcctttcc ttgttgatga 960
139 agctcttctc gtgccggcga aaatctaggc cataaaagcc tcttcaacat cacctagtat 1020
141 attgaccgtg accattttt tgaccattgc tttgtgaatg aaccgtcgat aaaccgtgtt 1080
143 atcacttacg ccaaattttt ccctagtgtt tgtttccaaa ctctcacgaa tccttacatcg 1140
145 actttttat atatcactt gtagcattgg aaagtatctt tgtatgtttt gtcttaaact 1200
147 tagacatcct tggctcttgc gttttttgtt accttgctt actttaaatga agttaaaaat 1260
149 ttgttagttaa aaatagaaaa ttttactaat ttgagttcga ttaatcatag tctagataat 1320
151 ttgaaaaaaa ttaaaataaa tttgaaaaat actatatgtt tatttttaa aaataattta 1380
153 ctaaatttat aagtgatatt agatttagttt tttttttctt ttttaaattt tgaaaacctc 1440
155 acaatttata aattgaaaga ttcaaaatgc aatgttagtt tttaaaagtt taatcaccca 1500
157 aacggataat tgacccgaac gactaattca ggtcgtatac gggtagtc aaataacccg 1560

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/824,735

DATE: 09/07/2001
TIME: 14:11:35

Input Set : A:\205645US20.txt
Output Set: N:\CRF3\09072001\I824735.raw

159	acccgaaatg	ctcaacggat	ctgcacggac	gttcgcacatcg	acgattcaca	gctttcgca	1620
161	atcgcatcac	gaggccttcct	tctctcctac	gcctctttca	tcaacccttc	tctgcgaatc	1680
163	caattctgg	atttcacat	tctcttcga	ctacgccccaa	tcgcaattcc	agccgtacga	1740
165	attttatata	ttgattatga	tcttgatcct	tacctttcg	tcgtttcctt	gatcgaattt	1800
167	atgttgattt	atgctgcgaa	atcaaaaatta	tggatacaga	gtaattttgt	atatatggat	1860
169	gtgttaggagc	taaaaattagc	aaacaatacg	taaagtaatt	gaaatcgaaa	tcataaacgt	1920
171	ttaaggaaag	aggttttac	taagtctctg	aataatctga	ttgatagctt	gtggtcaatg	1980
173	gatcagataa	aagtttgtaa	aga atg aca	aag aaa atg	aga aga gtg	ggc aag	2033
174			Met Thr Lys	Lys Met Arg	Arg Val Gly	Lys	
175			1	5		10	
177	tac gag gtt	ggt cgc aca	ata ggt gaa	gga acc ttt	gct aag gtt	aag	2081
178	Tyr Glu Val	Gly Arg Thr	Ile Gly Glu	Gly Thr Phe	Ala Lys Val	Lys	
179			15	20		25	
181	ttt gcg agg	aac aca gac	act ggt gat	aat gta gcc	atc aaa att	atg	2129
182	Phe Ala Arg	Asn Thr Asp	Thr Gly Asp	Asn Val Ala	Ile Lys Ile	Met	
183			30	35		40	
185	gct aag agt	aca ata ctt	aag aac aga	atg gtt gat	cag gtatgttctg		2178
186	Ala Lys Ser	Thr Ile Leu	Lys Asn Arg	Met Val Asp	Gln		
187			45	50		55	
189	gattgtttt	tacatggaaa	ctaagggtgt	tgcgtcaatg	gtatgatctt	tgatttcgtt	2238
191	taaagctctt	ttacag ata	aaa aga gag	ata tct ata	atg aag att	gtt cgt	2290
192			Ile Lys Arg	Glu Ile Ser	Ile Met Lys	Ile Val Arg	
193					60	65	
195	cac ccg aac	ata gtg agg	ttg tat gag	gtatgttctt	ttgtttccat		2337
196	His Pro Asn	Ile Val Arg	Leu Tyr Glu				
197			70	75			
199	gcatctgcga	aattttatct	ctgaagtgtt	tttgcatcat	tgttcttctg	ttgttttttt	2397
201	gtgattttcc	cgatgtag	gtg ttg	gag cct tcg	aaa ata tat	ata gtt	2448
202			Val Leu Ala	Ser Pro Ser	Lys Ile	Tyr Ile Val	
203					80	85	
205	ttg gag ttt	gtg aca gga	gga gag ctc	ttt gat aga	att gtacggaact		2497
206	Leu Glu Phe	Val Thr Gly	Gly Glu Leu	Phe Asp Arg	Ile		
207			90	95		100	
209	tccatacttg	taggcagcgt	ccatttagtta	aaacctctct	acttaatttt	ttaatataatg	2557
211	aaatctttca	tgcag gtt	cat aaa ggg	agg ctt gaa	gaa agt gag	tct cgg	2608
212			Val His Lys	Gly Arg Leu	Glu Glu Ser	Glu Ser Arg	
213					105	110	
215	aaa tac ttt	caa cag ctt	gta gat gct	gct cat tgt	cac tgc aag		2656
216	Lys Tyr Phe	Gln Gln Leu	Val Asp Ala	Val Ala His	Cys His Cys	Lys	
217			115	120		125	
219	ggt gtt tac	cac cgt gac	cta aag gtaaagacgt	gtttttgttt	accaatattc		2710
220	Gly Val Tyr	His Arg Asp	Leu Lys				
221			130	135			
223	ctcagaatat	ctcaactgcgt	tgcaatccag	acttgatatt	tttgcgtcgc	tatgttatgt	2770
225	tatcttag	cca gaa aat	ctt tta ctc	gat aca aat	gga aat ctg	aag gtt	2819
226			Pro Glu Asn	Leu Leu Asp	Thr Asn Gly	Asn Leu Lys	
227					140	145	150
229	tcg gat ttc	gga ctc agt	gca ttg cct	cag gaa gtaagtgc	tc	ttatctctgc	2872
230	Ser Asp Phe	Gly Leu Ser	Ala Leu Pro	Gln Glu			

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/824,735

DATE: 09/07/2001
TIME: 14:11:35

Input Set : A:\205645US20.txt
Output Set: N:\CRF3\09072001\I824735.raw

231	155	160																
233	ttcagcagtc	tgcttacgtg	gtcatttaact	tgtttatatac	tcaatcag	gga	gta	gaa	2929									
234							Gly	Val	Glu									
237	ctt	ctg	cgt	acc	aca	tgt	gga	act	ccg	aac	tat	gta	gct	cca	gag	gta	2977	
238	Leu	Leu	Arg	Thr	Thr	Cys	Gly	Thr	Pro	Asn	Tyr	Val	Ala	Pro	Glu	Val		
239	165			170			175			180								
241	ctt	agt	gga	cag	ggt	tac	gat	ggt	tca	gca	gct	gat	att	tgg	tct	tgc	3025	
242	Leu	Ser	Gly	Gln	Gly	Tyr	Asp	Gly	Ser	Ala	Ala	Asp	Ile	Trp	Ser	Cys		
243				185			190			195								
245	ggg	gtt	att	ctt	ttc	gtt	ata	ttg	gct	gga	tat	tta	cct	ttt	tcc	gag	3073	
246	Gly	Val	Ile	Leu	Phe	Val	Ile	Leu	Ala	Gly	Tyr	Leu	Pro	Phe	Ser	Glu		
247				200			205			210								
249	acg	gat	ctt	cca	ggg	ttg	tac	aga	aaa	gtaa	gtaa	aca	tat	ttt	tcgg		3120	
250	Thr	Asp	Leu	Pro	Gly	Leu	Tyr	Arg	Lys									
251		215				220												
253	gaagaaatca	tgaattcctt	gtcatggcctt	ttgtcaaacc	gtttatttgc	tttggtttgc											3180	
255	aatttcaccc	ttagtttga	gctttacac	attgttattt	acag	ata	aat	gca	gca								3236	
256								Ile	Asn	Ala	Ala							
257												225						
259	gag	ttt	tct	tgt	cca	ccg	tgg	ttt	tcc	gca	gaa	gtg	aag	ttt	tta	ata	3284	
260	Glu	Phe	Ser	Cys	Pro	Pro	Trp	Phe	Ser	Ala	Glu	Val	Lys	Phe	Leu	Ile		
261				230			235			240								
263	cat	agg	ata	ctt	gac	ccc	aat	ccc	aaa	aca	gtgagtttt	tgctttgttc					3334	
264	His	Arg	Ile	Leu	Asp	Pro	Asn	Pro	Lys	Thr								
265		245				250												
267	tctcctagct	atcaggttt	ggtgatattt	aatgttctag	taattatatac	tgtttatctta											3394	
269	ttattgttgc	tcaatttagag	cag	cgt	att	caa	att	caa	gga	atc	aag	aaa	gat				3447	
270								Arg	Ile	Gln	Ile	Gln	Gly	Ile	Lys	Asp		
271							255			260								
273	cct	tgg	ttc	aga	tta	aat	tat	gtg	cct	ata	cga	gca	agg	gaa	gaa	gaa	3495	
274	Pro	Trp	Phe	Arg	Leu	Asn	Tyr	Val	Pro	Ile	Arg	Ala	Arg	Glu	Glu	Glu		
275		265				270			275									
277	gaa	gtg	aat	ttg	gat	gat	att	cgt	gca	gtt	ttt	gat	gga	att	gag		3540	
278	Glu	Val	Asn	Leu	Asp	Asp	Ile	Arg	Ala	Val	Phe	Asp	Gly	Ile	Glu			
279		280				285			290									
281	gtttgtgcctt	cgcccttcatt	atatgctctt	tgctggtaa	ttccatttaa	atgttaagat											3600	
283	ctcttagaa	cgtttggatg	accaagaaga	agtgttgct	acaggataga	acaaaatagt											3660	
285	aggcatgtgt	tagttaccaa	acctgttaac	tgcttcttta	ttcaattcgc	caaaccatag											3720	
287	accttagaa	gacttagatt	tacaagagaa	ttctcttattc	tcgaccaaaa	acccttagaca											3780	
289	aaatccagaa	tacccctagg	gctaattaca	atgttcatgt	acctatcaat	atatatctcc											3840	
291	tgctaagatt	gtcttagctt	tggtatagcc	tagatata	tagataccgt	aatttcttaat											3900	
293	gcatatttag	aatgttttac	ttaaactcag	gctcttgctc	ttctaaaact	tgtacttcaa											3960	
295	ttgttaaact	aaaacctcag	tatctgtctt	agctaaagtt	actttactt	gtttttcatt											4020	
297	aagttgaccc	gtcaattgca	cttggcaca	g	ggc	agt	tat	gta	gca	gag	aat						4072	
298								Gly	Ser	Tyr	Val	Ala	Glu	Asn				
299							295											
301	gta	gag	aga	aat	gat	gaa	ggg	ccc	ctg	atg	atg	aat	gcc	ttt	gag	atg	4120	
302	Val	Glu	Arg	Asn	Asp	Glu	Gly	Pro	Leu	Met	Met	Asn	Ala	Phe	Glu	Met		
303	300					305				310			315					

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/824,735

DATE: 09/07/2001
TIME: 14:11:35

Input Set : A:\205645US20.txt
Output Set: N:\CRF3\09072001\I824735.raw

305 att acc tta tca caa ggc tta aat tta tct gca cta ttt gac agg cga	4168
306 Ile Thr Leu Ser Gln Gly Leu Asn Leu Ser Ala Leu Phe Asp Arg Arg	
307 320 325 330	
309 cag gtagtacctg attttctatt actggcata gagatctcca tttcgaataa	4221
310 Gln	
313 aagaatgtcg gtagcatcta ttcttcagac tgcccgaaaa gactgcctta tgatgctgtg	4281
315 ttcttagttt gttataataa ctataagttc attagatgtat tggttgcattt gcatttagtag	4341
317 atacaaatgg aatccaaaat gttcctgcattt attgtatggctt gatccttgcattt tctcgca	4399
319 gat ttt gtt aaa agg caa acc cgt ttt gtt tct cga agg gaa cct agt	4447
320 Asp Phe Val Lys Arg Gln Thr Arg Phe Val Ser Arg Arg Glu Pro Ser	
321 335 340 345	
323 gag ata att gct aac att gag gct gta gcg aac tca atg ggt ttt aag	4495
324 Glu Ile Ile Ala Asn Ile Glu Ala Val Ala Asn Ser Met Gly Phe Lys	
325 350 355 360	
327 tct cat aca cga aac ttc aag gtaacgaatt cctagcatat tacacttatac	4546
328 Ser His Thr Arg Asn Phe Lys	
329 365 370	
331 acagagatta tgcattattt taaaactctc aactgttaaa cgcatgtgt gatagattga	4606
333 taagattgac aaggaaactt agtttatatc tctggcggttc aaaaacgaaa gtcctatgtt	4666
335 gaattatcat tttaatgtt agcagagat acaattgtta tgatttgcattt cgtctatgtt	4726
337 ctcaacag aca agg ctc gag gga tta tct tcg atc aag gcc gga cag tta	4776
338 Thr Arg Leu Glu Gly Leu Ser Ser Ile Lys Ala Gly Gln Leu	
339 375 380 385	
341 gct gtt gtg ata gag gtaattatttg cttgttgcattt ttgttaatata agtttgctt	4831
342 Ala Val Val Ile Glu	
343 390	
345 gcttcagttt aagggtatct agcaaattga aattaaaccta catgcag att tac gag	4887
346 Ile Tyr Glu	
349 gtg gca cca tcg ctt ttc atg gta gac gta aga aag gct gct ggt gaa	4935
350 Val Ala Pro Ser Leu Phe Met Val Asp Val Arg Lys Ala Ala Gly Glu	
351 395 400 405	
353 act ctt gaa tat cac aag gtttataat atatatccaa taacaatagt	4983
354 Thr Leu Glu Tyr His Lys	
355 410 415	
357 tgcattatca ctgtgttgcg gattagatgtt atattttgtt ttgtggatc gcag ttc	5040
358 Phe	
361 tac aag aag cta tgt tcg aaa ctg gaa aac ata ata tgg agg gca aca	5088
362 Tyr Lys Lys Leu Cys Ser Lys Leu Glu Asn Ile Ile Trp Arg Ala Thr	
363 420 425 430	
365 gaa gga ata cca aag tca gag att ctc aga aca atc acg ttt	5130
366 Glu Gly Ile Pro Lys Ser Glu Ile Leu Arg Thr Ile Thr Phe	
367 435 440 445	
369 tgatccaaac ttaa	5144
372 <210> SEQ ID NO: 2	
373 <211> LENGTH: 446	
374 <212> TYPE: PRT	
375 <213> ORGANISM: Arabidopsis thaliana	
377 <400> SEQUENCE: 2	
379 Met Thr Lys Lys Met Arg Arg Val Gly Lys Tyr Glu Val Gly Arg Thr	

VERIFICATION SUMMARY

PATENT APPLICATION: US/09/824,735

DATE: 09/07/2001

TIME: 14:11:36

Input Set : A:\205645US20.txt

Output Set: N:\CRF3\09072001\I824735.raw

L:14 M:271 C: Current Filing Date differs, Replaced Current Filing Date